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EDUCATION

SCHOOL BUILDINGS AND EQUIPMENT

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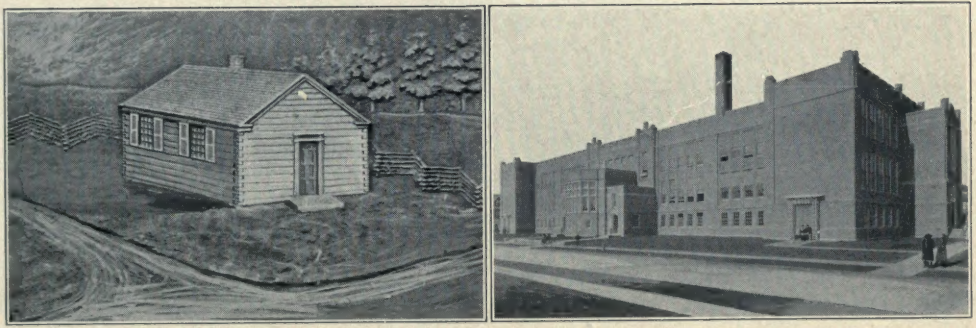

Earliest and latest Cleveland school buildings. 1816–1916

Educat.
Teach.
A

CLEVELAND EDUCATION SURVEY

SCHOOL BUILDINGS AND EQUIPMENT

BY

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AND

MAY AYRES

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THE SURVEY COMMITTEE OF THE
CLEVELAND FOUNDATION
CLEVELAND · OHIO

8 1916

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WM. F. FELL CO. PRINTERS
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FOREWORD

This report on "School Buildings and Equipment" is one of the 25 sections of the report of the Educational Survey of Cleveland conducted by the Survey Committee of the Cleveland Foundation in 1915. Twenty-three of these sections will be published as separate monographs. In addition there will be a larger volume giving a summary of the findings and recommendations relating to the regular work of the public schools, and a second similar volume giving the summary of those sections relating to industrial education. Copies of all these publications may be obtained from the Cleveland Foundation. They may also be obtained from the Division of Education of the Russell Sage Foundation, New York City. A complete list will be found in the back of this volume, together with prices.

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SCHOOL BUILDINGS AND EQUIPMENT

CHAPTER I

ADVANCING STANDARDS IN SCHOOL-HOUSE CONSTRUCTION

Cleveland has been building schools for 100 years. In 1816 the inhabitants of the village erected a wooden school building in a grove of oak trees on St. Clair Street. This building was about 30 feet long by 24 feet wide and its appearance is probably represented with fair accuracy by the illustration in the frontispiece of this volume. The cost of this building was $198.70 and this sum was contributed by 25 citizens in amounts ranging from $2.50 to $20 apiece.

During the decades which have elapsed since this early beginning, Cleveland has increasingly devoted its money and its energies to the task of supplying adequate buildings for its school children. Two conditions have been steadily present during this century of effort and ex-

penditure. No matter how rapidly new buildings were erected, and how generously funds were supplied, the demands for more buildings and more money have always rapidly increased.

The school of 100 years ago cost $200 and had one classroom; those erected now cost 1000 times as much although they have only 20 classrooms. In the 10 years from 1840 through 1850, Cleveland spent $12,000 for school buildings. During the decade from 1905 through 1915, the city has spent over $9,000,000 for the same purpose. The population now is 40 times as large as it was then, but the expenditures for school buildings have been nearly 800 times as great.

It is the purpose of this volume to report on the causes of this immensely rapid increase in the cost of school accommodations and to consider what the community is receiving in return for its great investments.

Changes Due to Newer Educational Methods

The enormous increases in expenditures for school buildings are due in part to the steady growth in population; but much more to changing ideals on the part of the people as to what they want for their children. The school build-

ing policy of the American people is being shaped by five watchwords of progress: Education, Economy, Safety, Health, and Happiness.

George Watkins, one of the pioneers of Cleveland, has described for us the Giddings Avenue School, built in 1822. "The building was about 15 by 20 feet. It was called a block house because the logs were hewn out between the sides. It was lighted by five windows. The old stone fireplace was six feet wide across. On three sides of the room was a platform seven or eight feet wide and about one foot high. An upright board was placed one foot away from the edge of the platform. Here the little children sat, the board serving for the back of their seats. On the platform and against the wall at the proper height was the writing desk of the older pupils. The desk was continuous around three sides of the room. The seats, like the desks, were of unplaned slabs each running parallel with the desk. When it was writing time, the boys and girls had to swing their feet over and proceed to business. We wrote with a goose quill, and every morning the master set our copies and mended our pens. We had school but three months in the winter."

In most of the early schools a long bench was placed in the center of the floor, somewhat near the front, and classes about to recite were called

out to the bench. There were no blackboards and few books. Windows were on each side of the building, and,—as the old records show,—"were built of sufficient height so that the children could not look out of them."

Most of the earlier developments in planning were those which had to do with the actual processes of teaching and learning. Thus, we find the recitation bench abolished, and individual chairs gradually taking the place of plank and platform. Buildings were provided with different rooms for different groups of children. Window space was enlarged in order to secure better lighting. Blackboards were early introduced. School libraries were started in 1850, and special provision was soon made for library rooms.

The movement has continued until today we find buildings filled with special rooms for special purposes; classroom furniture built, placed, and adjusted with a view towards greatest usefulness; every vestige of the platform (even that under the teacher's desk) removed; bulletin boards in classrooms; moving picture apparatus in auditoriums; and constantly increasing thought for aesthetic training through beautiful architecture, pictures, statuary, and mural decorations.

Compared with other cities, Cleveland has

had very little to unlearn in the matter of building economy. Only rarely has the city had to retrace its steps; and for the most part progress has been steadily forward. Brick and wood combinations have given place to fireproof construction. Plans have been elaborated as needs have grown. Architects and engineers have been employed as members of the permanent staff, and uniform standards of building construction are gradually being adopted to secure beauty, durability, and usefulness at the lowest ultimate cost.

Changes Making for Safety

Ten years ago there was comparatively little concern about the safety of school buildings. Today the attitude of school officials has changed from indifference to active interest. In 1908 the Lakeview School in the town of Collinwood burned down and 178 children and two teachers lost their lives. It was a brick and wood structure of the "expanded central hall" type, with wooden stairs, doors swinging outwards, and fire escapes. It was a better, safer building than many still in use in most of the large cities of the United States. It was merely chance that made Collinwood the scene of the tragedy. A gale of wind, wood floors and stairs, strong draughts, an awkward exit, and the rush

of panic-striken children combined to produce a horror for which no single person could be held responsible.

Today, there are only a few cities in the country where the Collinwood disaster could not be repeated. Cleveland stands high among these few. Every old building in the system is safeguarded; every new building fireproof. Fire drills are regular and frequent and involve use of fire escapes and changes in stairs and exits. Cleveland parents may entrust their children to the public schools without anxiety as to their safety.

Changes Making for Health

One of the influences most potent in changing types of school architecture during recent years has been an increasing realization that the health of the children is a public trust; and as such provision for its care is properly a function of the public school.

As a result of this changed conception we find specialists whose sole duty it is to study matters of sanitation,—toilets, washstands, shower baths, drinking fountains; and others who are conducting extensive experiments with different forms of ventilation, air washing, heating, and automatic controls. In all the newer buildings of this city classrooms are lighted from

one side only, and windows are specially placed to avoid eyestrain, while the walls and ceilings of rooms are tinted in colors prescribed according to the compass points towards which the windows face. Chairs and desks are made adjustable to the size of the children who use them.

Rosedale School garden

Special rooms are planned for medical inspection dispensaries, open air classes, and rest rooms. Walls of corridors and basements are glazed so that they can be washed down with soap and water, and vacuum cleaning systems are increasing in favor.

Changes Making for Happiness

From our modern carefully equipped playgrounds and spacious auditoriums, it is a far cry to the times when members of the Board of Education directed the teachers to discourage marble playing and bitterly fought against the introduction of singing in the schools.

The school of today is beginning to recognize that play is a necessary activity of growth, and is laying increasing emphasis upon space, equipment, and instruction within school properties for play and recreational purposes. The playground has long been recognized as an essential portion of school premises. Of late, we find special playgrounds for different groups of children, with running tracks, swings, slides, and sandpiles. Many of the newer buildings are equipped with roof playgrounds in addition, and nearly every school has indoor playrooms for boys and girls. Gymnasiums, swimming pools, and lunch-rooms are provided in increasing numbers, both because of their contribution to happiness and comfort, and because of the aid they furnish in building up the health of the children. Auditoriums are built with stereopticon equipment, stages, and footlights. Undoubtedly many of the most striking changes in school architecture in the near future will result

from this determined effort to teach the children how to play.

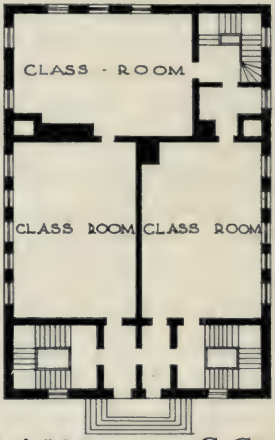
Education, economy, safety, health, and happiness are expensive under modern city conditions and it is because the citizens of Cleveland consider them valuable as well as expensive that they are willing to pay great sums to secure them for their children.

CHAPTER II

DEVELOPMENTS IN SEVEN DECADES

By 1850 Cleveland had developed a well organized school system. Buildings were erected for long years of service. Equipment, grading, high schools, course of study, attendance, school census, teachers' licenses, were all matters upon which definite policies were being formulated. By this time, also, the matter of constructing school buildings had emerged from a haphazard handling into a definite policy. Some of the schools erected in the 50's were so wisely planned and excellently built that they are still in use by Cleveland school children.

The plans and illustrations presented in the following pages of this chapter show the evolution of the public school buildings of Cleveland through the seven decades from 1850 to the present time. They indicate some of the developments which involve increasingly large expenditures and provide increasingly valuable results. The schools illustrated were built at the close of the decades referred to, or even a year or more later, so they may be considered as showing the accomplishments of each period.



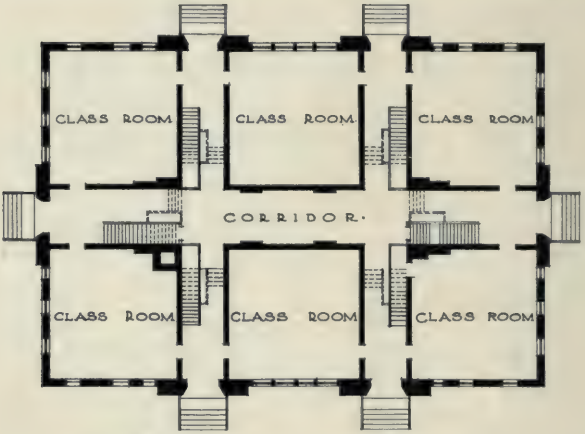
ALABAMA · SCHOOL
PLAN OF FIRST FLOOR

SCALE 10 5 0 10 20 30 40 50 FEET

The Schools of the 50's

The type of building erected during the 50's is well represented by the Alabama School, although this particular building was not completed until 1861. Several buildings of this general type are still in use in the city. Among them are the Wade, Pearl, Alabama, and the oldest portions of the Hicks and Kentucky buildings. In these early buildings the rooms were large and accommodated enormous numbers of children. Classes ranged from 100 to 200 in each room. There was hardly a square foot of waste space in these buildings. Originally they contained no corridors, no wardrobes, no toilets, no storerooms, no running water, and no heating plants except stoves. If we were content with such accommodations today, and if we should crowd from 100 to 200 pupils into each room, we could at one stroke divide our building costs by 10.

In respect to their window arrangements, these old buildings were in advance of their times. Two of the three rooms on each floor were lighted from one side only, while the third was lighted from the left and rear. Window area was ample and the masonry divisions between windows were narrow and cast but little shadow.

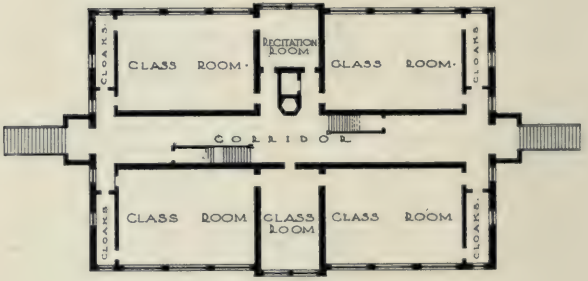


· STERLING · SCHOOL
· PLAN · OF · FIRST · FLOOR ·

The Schools of the 60's

In the 60's the citizens of Cleveland had begun seriously to consider architectural values in their school buildings. Gothic windows and arched entrances became the rule, while ornamentation, through stone trimmings, became common. The Sterling, the St. Clair, the Rockwell, and the Orchard schools are typical buildings of this decade. When they were built it was agreed that they were the finest school buildings in Ohio.

In some respects they did not represent real advance over the earlier and simpler structures. The windows were narrow and deep-set and most of the rooms were lighted from two sides. The stairs were curiously complicated. Six flights led from the first floor to halls just below the level of the second floor and from here six more short flights led to small platforms outside the classrooms. Two flights of winding stairs with wedge-shaped treads led from the second floor to the third. No provision was made for wardrobes, special rooms, or offices. With all their imperfections, these buildings mark the transition from the public feeling that almost any building would do for a school, to the community conviction that the finest building was none too good for the children's use.



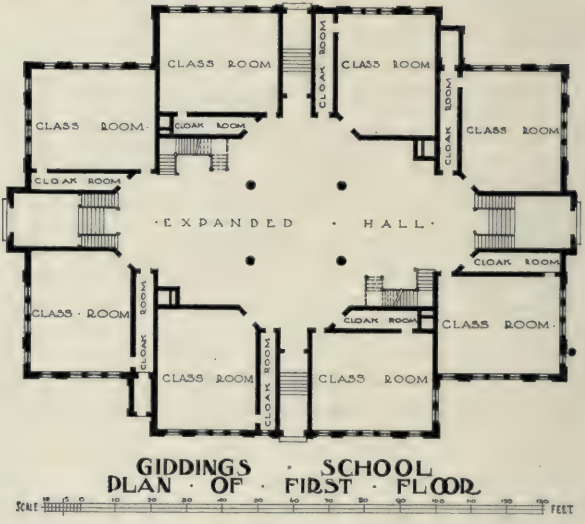
· DIKE · SCHOOL ·
PLAN · OF · FIRST · FLOOR

The Schools of the 70's

In the late 70's, and for several of the earlier years of the next decade, the new buildings were of the style and plan illustrated by the Dike School. The window arrangement in these buildings was better than in the earlier ones. Rooms were lighted from one side only and the windows were banked in pairs so that the light was but little obstructed. The stairs were straight but very narrow and were built in the long central corridors which were seriously obstructed by them.

These buildings were two stories in height and contained eight large classrooms, two small classrooms, and two small recitation rooms. All of the large rooms were provided with coat-rooms which had by this time come to be recognized as necessary features of school buildings.

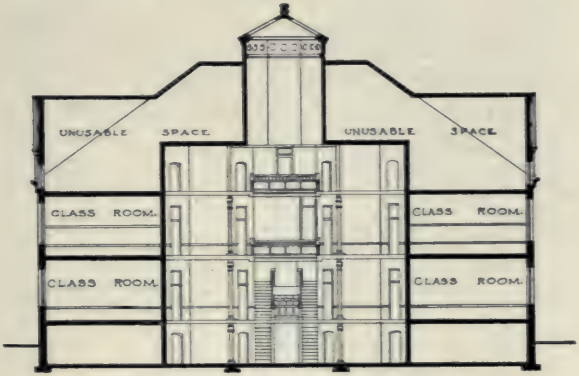
These buildings cost $28,000 apiece and were designed to accommodate from 700 to 800 pupils, which made the cost for each pupil something less than $40, which is very different from the per capita cost of about $200 in the buildings now being erected. Money for the erection of these schools was raised by issuing three-year six per cent bonds.



GIDDINGS SCHOOL
PLAN OF FIRST FLOOR

The Schools of the 80's

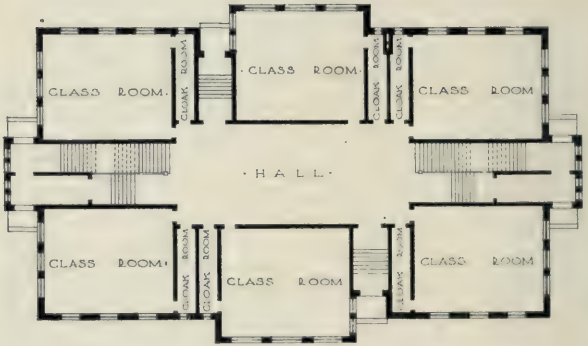
During the late 80's, Cleveland began to construct 16 room buildings of the type illustrated by the picture and plan of the Giddings School. It now has more of this type than of any other. The great expanded hall had been tried in schools built as early as 1865 and was designed for use as an auditorium.



GIDDINGS SCHOOL
TRANSVERSE SECTION

SCALE FEET

The expanded hall has proved most unsatisfactory as an auditorium and it was secured through a most uneconomical use of space as is shown in the transverse section. In their day, they were considered triumphs of school architecture and commissions from all over the country came to see them.



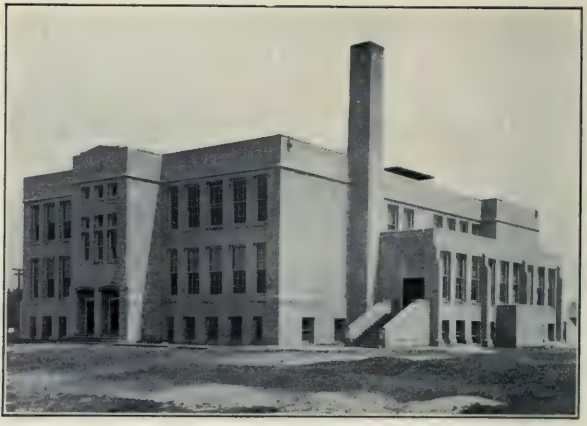
LAWN · SCHOOL
PLAN · OF · FIRST · FLOOR

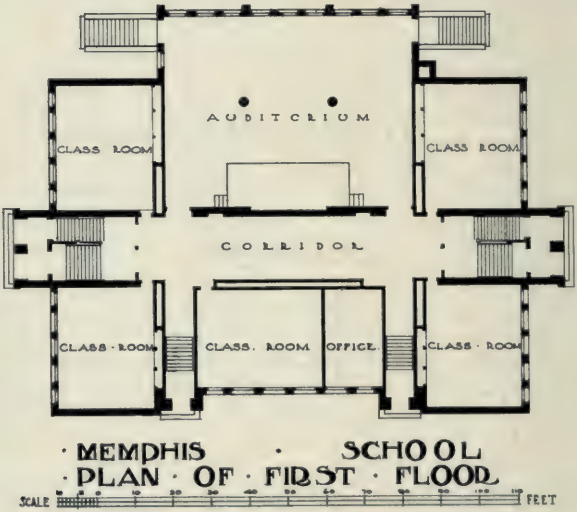
The Schools of the 90's

During the 90's, Cleveland, like other progressive cities, was building a most interesting type of building which marks the transition from the old styles to the new in school architecture. From the outside, these buildings may be recognized by their big roofs and their cupolas, although in this city these features are not so extreme as is common elsewhere.

These schools were either fireproof or of slow-burning construction. The chief reason for the enlarged roof was to provide space for the auditorium which was located on the third floor and was not a very useful part of the building. The lighting was better than in the older schools, but still far from ideal. In some rooms the windows were banked so that the light was allowed free access, while in other rooms light entered from two sides and was partly shut off by heavy masonry divisions between windows. Coatrooms were provided throughout and in the basement were special rooms.

It was in constructing buildings of this type that school architects learned that in order to meet modern demands they would have to discard the traditional ideas and invent a new sort of building. This they did in the next decade.





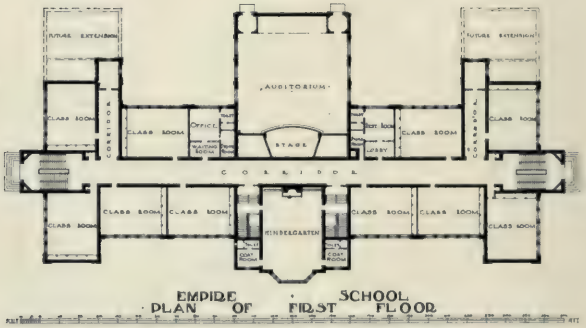
· MEMPHIS · SCHOOL
· PLAN · OF · FIRST · FLOOR ·

Schools from 1900 to 1910

By 1900, the school architects had developed an entirely new type of building of a sort well illustrated by the picture and plan of the Memphis School. These new buildings have flat roofs, because the flat roofs are better and cheaper than the pitched ones. All of the rooms have unilateral lighting and this necessitates leaving some blank exterior walls, but since this was unavoidable, the architects wisely decided to defy tradition and considered children's eyesight rather than critical public opinion.

The stairways in these buildings are at the ends of the halls, and like the rest of the structure, they are of fireproof material. All of the rooms have wardrobes so planned as to require much less space than in the earlier schools. The auditoriums are large, first-floor rooms with high platforms in the front and with the view of the stage somewhat seriously obstructed by steel pillars which support the rooms above.

Special rooms are provided for the office and dispensary and in the larger buildings there are rooms for manual training and domestic science. In the basements are playrooms for boys and girls and sometimes gymnasiums and shower baths.


FUTURE EXTENSION
AUDITORIUM
CLASS ROOM
CORRIDOR
CLASS ROOM
OFFICE
TEACHERS ROOM
STAGE
GIRLS
BOYS
CLASS ROOM
CLASS ROOM
FUTURE EXTENSION
CORRIDOR
CLASS ROOM
CLASS ROOM
CLASS ROOM
KINDERGARTEN
CLASS ROOM
CLASS ROOM
CLASS ROOM
CLASS ROOM
CLASS ROOM
EMPIRE SCHOOL
PLAN OF FIRST FLOOR

The Empire School, completed in the fall of 1915, represents the most modern type of school architecture. It is entirely fireproof and so constructed that new wings may be added for future extensions without injuring either the utility or the symmetry of the building. In appearance these newest buildings are great improvements over their immediate predecessors and educationally they are far superior. The windows are banked in sets of five and the masonry is so shaped as to cut off a minimum of light. Auditoriums have slanted floors like theaters, are unobstructed by pillars, and have real stages instead of platforms.

Gymnasiums for boys and for girls, swimming pool, playrooms, toilets, shower baths, auditorium, library, shops, and domestic science rooms can all be shut off from the rest of the building so that they can be conveniently used for social and community center purposes. In these schools mouldings are done away with, doors have no paneling, corners of floors and ceilings are smooth and rounded, stairways have solid balustrades, and every endeavor is made to leave dust and dirt no lodging place. Piping for vacuum cleaning, and the most modern heating, ventilating, and regulating apparatus are installed.

In the case of but few structures built by human hands is progress so rapid and so real that outward appearances can reveal age with almost exact accuracy.

Improvements are being made steadily and rapidly in the construction of our dwellings, churches, libraries, office buildings, factories, city halls, state capitols, bridges, and docks, but these developments are neither so great nor so rapid as to render former types obsolete, decade by decade, and almost year by year.

Progress of that unremitting sort is made only when unceasing demands are being met by tireless toil and keen intelligence. These conditions are found in the construction of our schoolhouses and our battleships, and almost nowhere else.

CHAPTER III

SOME CONDITIONS IN THE SCHOOL PLANT

Cleveland has 109 elementary and high and normal school plants. A school plant may consist of one building with grounds; or it may include old and new buildings, annexes, frame houses, and portables. Of 192 elementary buildings and annexes now in use, 65 were built within the past 10 years, 48 are 25 years old or more, and 8 were erected before the beginning of the Civil War.

Location

In a surprisingly large number of cases, Cleveland school buildings are located on corners with one or more lines of double street car tracks adjacent. This is partly due to the development of the city around old buildings; but it is also true of several of the new buildings where land has been purchased since car tracks were laid. Most authorities hold that buildings should be located on quiet side streets, and where possible placed at some distance back

from the line. Some of the teachers say that they are not disturbed by the noise of passing cars, while others complain that their work is constantly being interrupted. One of the most striking cases of this kind is at the Dunham school, which is set in a small plot of ground at the corner of two intersecting streets, each paved with brick and stone and each bearing a double line of street cars; while League Park baseball grounds are directly across the street. Both the car tracks and the ball grounds were located here subsequent to the erection of the school.

If the school must be so located that the children are compelled to 'cross car tracks in coming and going, it is probably safer to have those tracks on the streets immediately adjacent rather than one block away; for this arrangement allows the children at admission and dismissal to be under the immediate supervision of their teachers. When the location does not compel all or most of the children to cross car tracks it is undoubtedly better to choose a quiet street for the school. In any event every endeavor should be made to have the neighborhood of every school a zone of quiet. Where streets are paved with brick and stone the city should replace them with asphalt. If car tracks are present special care should be taken to keep

them in good repair, so as to minimize the noise; and in the unfortunate event of the car tracks turning the corner in front of the school special care should be exercised by the traction company to keep the rails at this point properly greased, so as to avoid loud screeching of the wheels against rails as the cars go around the corner.

Ornamentation of Grounds

Cleveland school grounds are attractive in appearance. Most of them have plots of grass on two sides; and these are ornamented with shrubs and gardens of flowering plants and foliage. The landscape gardening combines economical use of space with low cost and good artistic treatment. In comparison with other cities, Cleveland makes a distinctly good showing in this respect.

The problems involved are much more difficult than appears at first thought. Cleveland has shown wise generosity in purchasing large plots of ground for schools even where land is very expensive. Nevertheless the area is never large enough to provide all the playground space that could be desired and at the same time ample space for landscape gardening. The problems have been met by setting aside most of

the space for the children's use and providing a suitable surfacing for the playgrounds.

To the supervisor of school gardens has been assigned the task of laying out the small remainder of the plot in lawns, hedges, shrubbery, and flower beds. This work has been so skillfully handled that the members of the Survey Staff were unable to cite any other large city in which, in their opinion, the ornamentation of school grounds has been equally successful and at the same time so well subordinated to the demands for playground space.

Size of Classrooms

Most of the rooms in the old type expanded hall buildings are too large according to modern standards. The accepted measurements for classrooms are about 32 feet long, 25 feet wide, and 12½ feet high. Rooms in newer buildings are approximately in accord with these standards; but several of the older buildings have rooms about 33 feet long, 28 feet wide, and 14 or 15 feet high. Rooms of this size are undesirable because they are expensive and make seeing and hearing difficult for children in the back rows; and because there is usually a temptation to fill the empty spaces with extra desks. No teacher should be expected to care

Treatment of grounds at Doan School

for more than 40 children; but over one third of the classrooms in Cleveland have desks in excess of this number.

Lighting

About half the classrooms are lighted from two sides; very few from three; many from one. In no regular building are windows in the front of the room; although classes temporarily accommodated in old dwelling houses occasionally are forced to face the sunlight. In a few of the older buildings annex walls cut off too much light from adjacent classrooms. This, however, is comparatively rare.

In new buildings windows are of good size, and placed high; but they are in some cases too far front, so that light strikes into the eyes of many pupils. Windows should be arranged along the wall as near the back of the room as possible. Some teachers complain that the side window nearest the front causes a blurred light upon the blackboard.

Most of the school buildings are placed nearly or exactly facing north, south, east, or west. In these schools there are usually several rooms which receive north light only. This is true of many of the newest schools. One reason for building schools in this way is that north light is restful and easy to work by. On the other hand,

rooms lighted on the north side never receive a ray of sunlight from one year's end to the other. Sunless rooms are apt to be dark and cheerless. Recent experiments seem to show that contagious disease is mostly spread, not by germs flying in the air, but by direct carriers such as insects, food, drink, or mucous. Colds seem to be passed from one child to another through

Light from front window reflected from blackboard, causing bad glare. This will be obviated in rooms constructed as shown in plan on page 47.

minute drops of mucous which are sprayed into the air in coughing or sneezing. The best way to avoid contagion is to flood every corner of the room with sunshine and so render these drops sterile. It is probably a good plan to place the school building facing half way between the points of the compass, so that all

rooms may have sunlight during some part of the day.

Blackboards

Every regular classroom in the Cleveland public schools, whether in old or new buildings, is equipped with blackboards of good quality slate. This is an unusually fine record. Good blackboards are essential to good teaching; and their heavy initial cost is justified by durability and satisfactory service.

In some of the older schools, first and second grade classes are occupying rooms intended for upper grade children. In several of these, the blackboards are 36 inches from the floor. They should not be over 24 or 26 inches. If the expense of lowering the boards is considered prohibitive, a narrow platform might be constructed, so that little children would be able to write upon the blackboard without undue reaching and straining.

Color Scheme

The colors used in classrooms have been carefully worked out and standardized. Wood is of dark dull finish, ceilings just off white, walls creamy gray, dados French gray. Rooms with north light have a little more color mixed with

the gray than rooms with south light. Blackboards are of the natural dark slate color. Desks and chairs recently adopted are of a brownish dull stain, which does not reflect light.

Wardrobes

For the trained observer it is frequently possible to tell the age of a school building by the construction of the wardrobes or cloakrooms. From 1850 to 1860, and in the three Gothic buildings erected in 1869 no special rooms were set aside for this purpose, but hooks along corridors and stairways were provided to hold outer garments. Moveable cupboards have since been provided in the corridors of these schools.

With the advent of the expanded hall type we have wardrobes placed in the middle of each side of the building, each with a window, one door opening from the classroom, and one into the hall. Other buildings have wardrobes at the extreme ends, with windows to the outer air, and where six rooms are on the first floor, two wardrobes are placed lengthwise between classrooms and halls, without windows, but with one corridor door at each end and one from the room.

With the old style fireproof building we get

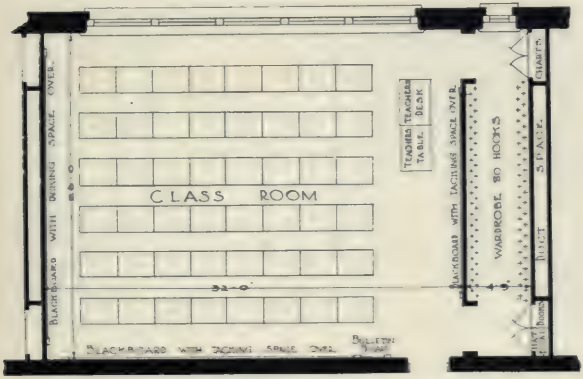
the first attempt at special ventilation of wardrobes. Narrow halls at the back of each room are provided with two doors, swinging inwards. There is no direct communication with the corridor. A ventilating opening is placed high in the wall, and air from the classroom is forced through the wardrobe on its way to the ventilating stack. A somewhat later development leaves two doorways, but removes the doors.

Modern school buildings no longer provide separate rooms for wardrobe purposes. Instead, a deep recess is cut into the wall of classroom or corridor just wide enough to provide space for fixtures and garments. These recesses are closed by sliding panels; and a current of air is kept constantly in circulation through the clothing and to the outer air.

The fixtures used in most of the Cleveland wardrobes are of good design with special places for hats, coats, rubbers, and umbrellas. They are placed low enough so that even the little children can reach them without difficulty.

Very recently Cleveland's School Architect has devised a new and improved type of wardrobe which is illustrated in the plan on page 47. This does away with the sliding panels, provides space and fixtures enough for hats and wraps of 80 children, and supplies greatly increased closet space for books and school-room appara-

tus. The immediate object of this new type was to meet the demands created by the platoon-plan of school organization in which two sets of children use one classroom. The advantages of this new type of wardrobe are so great that it should be adopted for new buildings even where it is not expected that the platoon-plan will be used.



CLASS ROOM & CLOAK ROOM 1916 -

Furniture

For many years Cleveland has struggled with the problem of adjustable furniture. At the present time nearly three-fourths of the rooms are equipped with adjustable seats and desks; most of them of excellent type. An order for

5,000 additional seats and desks has been placed to do away with some of the older equipment. In the newest schools, desks are made with boxes rather than shelves for books; provided with slanting covers; and stained in a neutral tone with a surface but slightly polished, so that light is not reflected into the eyes of the pupils.

This furniture is well designed; but its chief advantage is lost if not properly placed. In order that a child may sit comfortably, the front edge of the chair should extend about one and a half or two inches under the edge of the desk. We have all had experience with lunch rooms where the revolving stools were fastened too far out from the counter. Similar discomfort is felt by children who are forced to sit forward on the edge of their chairs in order to reach the desks. In some of the Cleveland schools where new furniture is now being installed, there is a space between the edge of chair and desk although the standard method prevents this. Care should be taken in installing new furniture to see to it that there is an overlapping of at least one and a half inches. After each promotion period, every room should be inspected to see that chairs and desks have been adjusted to fit the needs of the children using them. Increasing use is being made of moveable furniture.

In old buildings of the expanded or large central hall type the hallway on the first floor is used for assembly purposes. In some cases the second floor with railing around the light-well is used as a balcony.

In buildings of the earlier fireproof type the auditorium is a large room sometimes on the

Expanded hall. Expensive of space and not satisfactory as an auditorium

first floor, and often on the second or third. The ceiling is frequently supported by pillars which obstruct the view. Some of these buildings have outside exits directly from the auditorium; most of them have not.

In the newest buildings the auditorium is in the first story without other rooms above it.

The roof is frequently made into a playground. The auditorium floor slants, like that of a theatre, so that seats in the rear are higher than those in front. Stages are of good size, and furnished with special lighting, and separate entrances. Two exits lead directly to the outer air. Special toilet rooms are placed near the exits. These auditoriums are greatly superior to the earlier types.

Gymnasiums, Swimming Pools, Showers

There are 31 rooms set aside for gymnasiums in the public elementary schools. Some of these have special apparatus installed; many have not. Gymnasiums are usually in the basement in the central part of one side of the building. They are large and fairly well lighted. Swimming pools and showers are sometimes close adjoining. Shower baths are most commonly placed each as the center of a nest of dressing rooms, partially separated from each other by wooden, slate, or marble partitions. Floors are of cement, and provided with drains. The newest buildings are equipped with two smaller gymnasiums instead of one. This is an improvement, for it makes it possible to conduct classes for boys and girls simultaneously.

Special Rooms

Many of the older buildings and most of the newer ones provide special rooms for kindergartens, libraries, playrooms, teachers' rest and lunch rooms, and for partially blind, mentally handicapped, manual training, domestic science, and open air classes. Kindergartens are always on the first floor, and usually have special toilet facilities. Manual training rooms are usually in the basement; and domestic science rooms either in the basement or on one of the upper floors.

Libraries

Several of the newer buildings were originally planned with rooms for branches of the public library. In some cases, because of over-crowding, these rooms have since been utilized for regular classes. Several libraries are housed in basement rooms, portable buildings, and hallways. It is to be hoped that in the near future arrangements will be made whereby branches of the public library may be located on school property, but directly accessible to the public, so that they may be open in the evening and on Saturdays as well as during school hours.

Dispensaries

Remarkably good work has been done by the school authorities in installing dispensaries for medical inspection in old buildings. All new buildings have regular rooms planned for this purpose. In most of the old buildings, special rooms have been fitted up—usually in the basement. These rooms are well lighted; painted in white or light colors, and provided with running water and standard equipment.

Provision for Community Center Activities

In the newer buildings, plans are made so that the auditorium, gymnasiums, playrooms, swimming pool, toilets, and library can be opened to the public without opening the rest of the school. This makes such buildings especially convenient for social center uses.

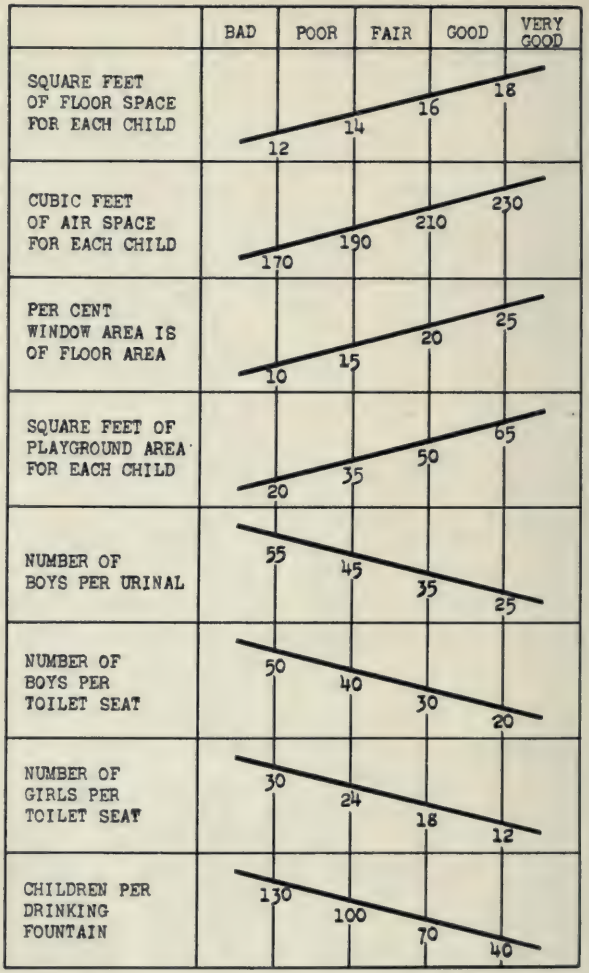
Stairs and Exits

Within the past decade, architects have learned the necessity of building stairways which shall be fireproof and panic proof. The stairs in many of the older buildings would not be tolerated in modern construction. They are of wood. Some are very dark. Many discharge into the center

of the building instead of to the exits. Some are too wide, others too steep, and almost all have large square-cornered landings. In buildings of the Gothic type, such as St. Clair and Sterling, there are six flights of stairs from the first to the second floor; three short flights from the second floor hall to rooms on the second floor; and two curving stairways, with treads narrow at one side and wide at the other, leading from the second to the third story.

Stairs such as these are exceedingly dangerous; yet to replace them is a costly process, and often rendered nearly impossible by the plan of the building. The architects and other building officials of the school system have shown great ingenuity in handling this problem. In every first floor room a glass door has replaced a window, and steps leading to the ground furnish an immediate and direct exit. Each room on the upper floor has a similar door leading to an iron platform which connects with one of several fire escapes. At many schools in fair weather these fire escapes are regularly used instead of the inner stairways; so that the children are thoroughly familiar with them, and in case of an alarm of fire would turn to the fire escape even more naturally than to the stairs.

Inside stairs have been provided with handrails on each side; and very wide stairs have



Some standards used in judging buildings

another rail down the center. Useless hallways, corners, and ornamental niches have been cut off by heavy wooden bars placed across them; so that in case of an alarm it would be impossible for little children to be crowded out of line into the corner by the impetuous rush of older pupils. The same precaution has been taken at the main entrances in cases where door jambs extend for some distance on either side.

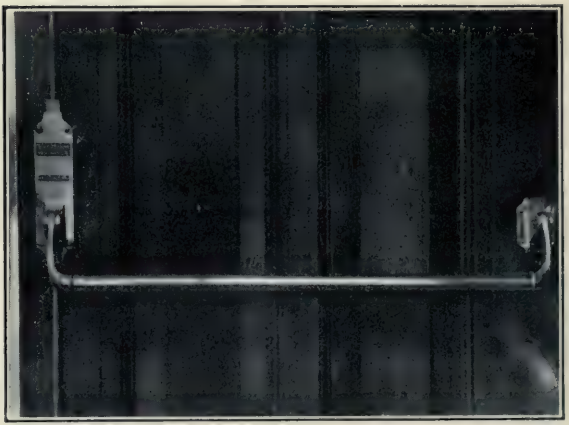
Stairs and hallways have been made much lighter by placing glass panels in the upper part of wooden doors; and in a few cases by inserting windows near the ceilings of classroom walls along the corridor.

Halls are usually wide, and finished in light colors. In most of the new buildings they are floored with cement, asphalt, or other fireproof material, and can be washed down by using the hose. Corners are rounded to prevent dirt gathering. One noteworthy feature of the Cleveland schools is the number of photographs, pictures, and statuary in rooms and corridors. The Mayflower school annex has a particularly good piece of mural decoration in the main hallway.

In the newest buildings stairs are of fireproof material and enclosed in fireproof partitions; so that in themselves they form the best type of fire escape. Handrails are placed on each side,

and down the center if the stairs are wide. Landings have no square corners, are well lighted, and free from obstruction. Stairs lead directly to outer exits.

All exit doors swing outward, in accordance with the Ohio law. Many buildings, both old



Best type of panic bolt used in new buildings

and new, are equipped with panic bolts; so that while the door is locked from the outside, it can always be opened by slight pressure from within. The newest buildings have panic bars which extend the entire width of the door. The weight of a body thrown against the bar automatically sets free the bolt.

CHAPTER IV

SAFETY AND SANITATION

Fire Protection

The schoolhouse building code of Ohio is probably the most stringent set of regulations concerning the construction of schoolhouses which has ever been enacted into law by a state legislature. It was directly the result of the tragedy at Collinwood. Cleveland is trying to live up to the code; and as a result there is probably no city in the country so large and so old as Cleveland where the danger of fire is so slight. The rapid increase in school population, and the scarcity of funds have precluded the possibility of discarding old buildings, and as a result the city has had to take schoolhouses erected 50 years ago and adapt them to fit modern ideas of safety.

There is not a building in the city with heating plant in the basement, where the basement ceiling is not lined with metal sheeting or other fireproof material. Wooden ceilings in base-

ments of old buildings are rapidly being replaced by concrete. Concrete slabs are placed directly over the heating plant. Fuel rooms in old buildings are lined with fireproof material, and in new buildings extend into the ground outside the main walls. Doors into furnace and toilet rooms are fireproof. Doors leading from basements to upper floors are fireproof. In new buildings entrance to the basement is completely separated from the rest of the building by fireproof walls as well as doors. Basements are kept scrupulously clean. No old furniture, waste paper, or kindling is allowed to remain in even remote and unused corners.

In the old plans there were often storage cupboards under wooden stairs. These have been lined with metal. In new buildings space beneath stairs is kept absolutely free. The treatment of stairs, landings, and exits has already been described in Chapter III. In some of the old buildings wooden stairs have been replaced by composite fireproof or iron stairs.

In non-fireproof buildings, every first-floor room has a separate fire exit. Upper rooms are connected by separate entrances to metal fire escapes. These fire escapes are all of the same type—platforms made of narrow iron strips with high fences around them; woven metal treads of the same width and depth as those of

inside stairs, and regulation height above one another; risers omitted; and fences and handrails down the stairs on both sides. Entrance to the fire escape is through a door with upper panels of glass which has taken the place of a classroom window. This door can be opened from the inside,—but has no handle on the outside—so that unauthorized persons are thus prevented from gaining entrance. Stairs lead directly to the ground and have no gates at the bottom. Fire escapes are not close to the building, but stand out about 10 feet, so that the danger from flames, which might break out through the windows and render the exit unsafe, is greatly lessened. Fire escapes are repainted every year. Snow and ice are cleared off immediately after every storm and children are given constant practice in descending.

Large wooden attics have usually been cut in portions by partitions, which would act as retarding agents in case of fire. There are few buildings in which the attics are really large, since the high pitched roof has not been popular in Cleveland. Attics are scrupulously free from old furniture, lumber, or other stores, and are kept clean. Entrance to the attic is locked. There are no buildings two stories or over with roofs of wooden shingles. Slate, tile, or other preparations have taken their place. In several

of the old buildings ornamental, but useless, towers have been removed.

In new buildings windows within less than 30 feet of adjoining properties are fitted with wire glass to prevent possible damage from neighboring fires.

Every school has a fire alarm which can be sounded by hand from all floors and basements. It is plainly labeled. Beside the alarm are hose, fire extinguisher, and axe. There is no automatic signal connection with fire headquarters. In case of fire, notice would be given by telephone.

It is probably true that there is not another city in America in which so wise and so thorough precautions against fire and panic have been taken. Many cities are erecting new fireproof schools; but Cleveland is doing this and in addition has panic-proofed her old buildings with a careful thoroughness that can hardly be too highly commended.

Toilets

The typical toilet room in the elementary school is located in the basement. Walls are whitewashed and the floor is of cement. The room is lighted from one or two sides by several small windows near the ceiling. Down the center of

Fire drill at East Madison School

the room runs a double row of toilets, placed back to back, and separated from each other by wooden partitions. Except in the newest schools there are no doors or screens to shield the occupants, either boys or girls. Toilets are of the latrine type,—that is, they all empty into one large trough running underneath, and are flushed at regular intervals by a central flushing system. The body of the toilet is usually of iron and the seat of wood with a wooden cover. All seats are the same height from the floor, without regard to the size of the children for whom they are intended.

In the boys' room, urinals of metal covered with white enamel paint, and supplied with iron bases are placed around the sides of the room. They are continually flushed by overflow or pierced pipes at the top, and are open to the room without dividing partitions or screens. In over half the schools metal urinals have been replaced by porcelain with glass bases of the same shape, and flushed in the same way. Where metal urinals are used, there is sometimes an unpleasant odor. Cement floors around latrines and urinals are usually discolored.

Toilet rooms receive little light from outside windows. Where the latrines are ranged down the center of the room, they cut off all sunlight,

and render the rooms so dark that artificial lighting is constantly necessary. In old buildings there are very few toilet rooms in which the sunlight ever reaches the farthest corner.

At one side of the room, against the wall, or else just outside the door, are placed at least one, and often four, sanitary drinking fountains, and beside them four wash basins with hot and cold water. In a few cases shower baths are also located in the toilet room.

Doors are of wood and frosted glass. They are in two parts with a post between. One side swings out, and the other in. All rooms are labeled. The boys' room is usually at the opposite end of the building from that of the girls'. Throughout the schools these rooms are exceptionally free from obscene writing.

The Board of Education is speedily replacing metal urinals with porcelain in old buildings. In a few of the newest buildings, the old style wooden seats are being replaced by wood or porcelain seats with open fronts, and occasionally the metal body is replaced by porcelain. In some buildings the stalls in the girls' toilet are provided with doors.

The Ohio code for schoolhouse construction provides one toilet seat for every 15 girls, one urinal for every 15 boys, and one seat for every 25 boys. The buildings in Cleveland were

originally fitted to correspond with these requirements, but since that time, many of them have been forced to house more children than was originally intended. Where classes are in auditoriums, "ground floor" rooms, portables, etc., extra provision has rarely been made for the toilet needs of the increased number of pupils. At Wooldridge, for example, there are 650 girls and 660 boys, of which, five classes are in portables, three in an old brick house, and three in a church. The only toilet facilities are in the basement of the main building, where there are 28 closets on the girls' side, 34 urinals and eight closets on the boys' side, four drinking fountains at each end of the basement, and one fountain on each floor. This means that there is a provision of one seat for every 24 girls, one urinal for every 19 boys, and one seat for every 94 boys. Wooldridge represents an extreme case. Yet, in many of the other schools, emergency classes have been established without extra toilet provision being made for the children. This is a hardship to which children should not be subjected.

A study of the toilet arrangements in the elementary schools leads to the following suggestions:

Wherever possible, seats should be placed around the walls of the room and urinals down

the center, because this arrangement avoids cutting off light from the windows. In the few schools where this has been done, the improvement is marked.

Most of the newer buildings provide drinking fountains outside the toilet room. This practice is preferable to placing them inside, because it separates the children into groups, and lessens the tendency towards loitering and confusion.

A few of the newer schools have asphalt floors in the toilet rooms. This is wise because uric acid sets up a chemical action in cement which cannot be corrected, and for this reason cement should not be used near seats and urinals.

The members of the Survey Staff believe that in all new buildings toilets should be provided with doors such as are now installed in the girls' toilet of the new Empire School. These should be arranged to swing in when not in use. Urinals should be separated by partitions. The citizens of Cleveland would not tolerate such exposure in their own homes, and there seems to be no good reason why they should expect it of their children.

In planning toilet rooms in new buildings, a careful study should be made of individual flushing systems, in an effort to find something more satisfactory than latrines. Probably a more effective method would be the individual

flush, where water is released by the removal of weight from the seat. The porcelain open-front seat now being introduced into the schools is a marked improvement upon the old style wood.

Care should be taken to provide seats of different heights from the floor for different sizes of children. In old buildings low benches might be placed in a few of the stalls, upon which small children can climb.

The policy of replacing metal urinals with porcelain and glass is strongly to be commended, and should be carried to a completion as rapidly as possible.

Whenever extra classes are established in ground floor rooms, auditoriums, portables, etc., toilet facilities should be correspondingly increased.

Heating and Ventilation

Within the past 25 years the civilized world has succeeded in solving a problem on which it has been working for many centuries, and now it is bitterly disappointed in the result. By the use of modern building methods, it has succeeded in constructing air-tight dwelling houses in which mid-summer temperatures may be achieved in mid-winter. As the race has strug-

gled onward and upward from life in the open to life in dens and caves, and through centuries of dwelling in thatched huts, log cabins, and finally in modern houses, its progress has been marked by successive and successful efforts to ward off the rigors of winter. Finally, and only in very recent years, our efforts have been crowned with success, and now we have reached the point where we can and do maintain summer temperatures in our homes and schools despite the coldest and most inclement weather out-of-doors.

A vast amount of effort has been expended upon the heating and ventilating plants of the Cleveland schools. Experiments are constantly being tried out; so that in the elementary schools alone there are 46 different combinations of apparatus, arranged to meet varying conditions in old and new buildings. Batteries of furnaces, boilers, and powerful fans have been installed in order to draw out the old impure air and force in new and bounteous supplies of fresh, heated air. Practically every building, old and new, is equipped with a system of thermographs hanging about six feet from the ceiling in the center of each classroom. These thermographs connect with the custodian's office and register the temperature of the classroom; so that he is able without leaving the

basement to know the heating conditions in every part of the building.

Despite all the thought and effort which have been expended in order to maintain an even temperature and a constant supply of pure air, the results have been far from satisfactory. Authorities on ventilation insist that where plenum systems are in use classroom windows must not be opened; and they demonstrate the reasonableness of their command by tests showing the purity of the classroom air. There are few teachers but have violated the rules, and in despair opened the windows; and there are few teachers but have been delighted to note the beneficial results on the mental attitude of the children and their ability to work. This, and similar incidents offer clear indication that the truly stupendous amounts of money and thought poured out upon this problem have not as yet succeeded in finding the correct solution.

It was with a realization of the necessity for more definite knowledge that a New York State Commission on Ventilation was appointed three years ago to study the problem. This commission is a body of scientific experts, representing every branch of medical, psychological, and engineering knowledge on the subject of ventilation, and provided with ample funds for

investigation. Its report has not yet been published; but it is already evident that new and important results will be brought to light.

One fundamental cause for the failure of our present ventilating systems was discovered many years ago. This is that we have constructed our ventilating systems upon the theory that the best air to breathe is air containing the lowest possible percentage of carbon dioxide. Now we are confronted with the surprising revelation, based on a long series of perfectly reliable scientific experiments, that in ordinary amounts the carbon dioxide in the air we breathe is neither harmful in itself nor a trustworthy indicator of the presence in the air of other harmful substances. On the contrary, the proper relationship of humidity to heat is a more important condition and factor. What we need is air that is in motion, and air that is not parched and dried up. Nevertheless the most recent findings of the New York Commission are to the effect that while stale air seems to be just as healthful as fresh air if it is sufficiently moist and in motion, children in rooms where air is stale assimilate less food than do children where the air is fresh. There is an undetermined factor there that has been unsuspected until recently.

The heating and ventilating problem in

Cleveland is probably as well handled as in almost any other large city. The engineers in charge are doing the best they can within their present field of knowledge, and waiting with interest the findings of those who are now investigating the problem. In view of the fact that the New York Commission on Ventilation has brought to light surprising facts hitherto unknown, and has not yet finished its labors, it seems the part of wisdom for the school authorities to suspend judgment as to what constitutes the best heating and ventilating system until the Commission publishes its final report.

CHAPTER V

COSTS

It is a difficult matter to make an accurate comparison between the costs of two or more school buildings, unless they are constructed on precisely the same plan and built on similar sites. As differences between school buildings increase, the difficulty of comparing their costs becomes rapidly greater. The reason for this is that there is no single satisfactory unit of comparison.

Cost per Pupil

Perhaps the commonest unit for comparing the schoolhouse costs is the cost per pupil. Thus, if one schoolhouse costs $60,000 and another costs $80,000, and each building has accommodations for 400 pupils, it is clear that the cost per pupil in the first building is $150, and in the second building, $200. It may well be, however, that the additional cost in the more expensive building is caused by the improved accommodations which that building furnishes. Both buildings

may have 10 classrooms, but the more expensive building may have in addition an auditorium, a gymnasium, a boys' play-room, a girls' play-room, and a nurse's room. The illustration makes it clear that the cost per pupil is not a satisfactory unit of comparison, unless it be further explained by specifying the accommodations provided for each pupil.

Cost per Classroom

The classroom is often taken as a unit of comparison, but as such it has all of the shortcomings mentioned in the case of the unit based on the cost per pupil. In addition, the classrooms may be small, accommodating only about 35 pupils each, or they may be large and accommodate about 50 pupils each. Moreover, some cities accommodate more pupils than do others in classrooms of the same dimensions.

Cost per Cubic Foot

Among school architects the cost per cubic foot is often taken as the unit for comparative cost data. In general, the number of cubic feet in a school building is arrived at by multiplying the ground area of the building by the distance from the lowest part of the basement floor to the

average height of the roof. There are, however, many variations in the method of computing the number of cubic feet, and there is no uniform practice among school architects in different cities. For this reason the cost per cubic foot is not an entirely satisfactory unit, except when used for buildings of similar construction and computed by precisely uniform methods.

Cost of School Buildings in Cleveland

The foregoing explanation concerning computations of building costs has been made in order to make clearer some of the methods followed in the present report in endeavoring to arrive at a just estimate of the degree of efficiency and economy maintaining in the planning and construction of Cleveland's schoolhouses.

In the endeavor to find out how this work as done in Cleveland compares with that done by other progressive cities, data have been secured covering recent operations in schoolhouse construction in Boston, Detroit, Newark, and St. Louis. These data have been compared with each other and with similar data for Cleveland schools. The data for the four other cities were secured through the courteous coöperation of the architectural and educational authorities of those municipalities. Each city has supplied

data for from seven to 11 recently constructed elementary school buildings of first-class fireproof construction. The data supplied and used in this report are the following:

1. Name of building
2. Date of construction
3. Number of regular classrooms
4. Cubic feet of building as computed by architect
5. Number of square feet of pure classroom space
6. List of the special rooms not included in the computation of pure classroom space
7. The cost of building without lot or furniture, but including the cost of the plans, specifications, and inspection service
8. The cost of plans, specifications, and inspection service.

The data showing the costs of these buildings in the five cities are presented in Tables 1, 2, 3, 4, and 5, on the following pages, while the special rooms in each building are enumerated in the corresponding lists A, B, C, D, and E.

The number of special rooms includes such rooms as auditoriums, gymnasiums, play-rooms, nurse's room, teachers' rooms, libraries, and so forth. It does not include the principal's office and reception room, store rooms, book rooms, janitor's room, or such portions of the building

as toilets, halls, wardrobes, and stairways. The endeavor has been to list as special rooms those rooms, other than classrooms, which possess a direct educational value for the children, and to omit parts of the building which are necessary for administrative purposes, but which must be included in every modern school building.

The number of pupils shown in the tables as accommodated in each building is not the number of fixed seats in the classrooms, but rather a number arrived at by allowing 18 square feet of pure classroom space for each pupil.

The figures showing the expense for plans, specifications, and inspection are those given by the educational and architectural authorities in all of the cities except Boston. In the case of that city the figures given are the result of computations made by a committee appointed by the Boston Finance Commission to investigate and report on educational expenditures.

TABLE 1.—COST DATA FOR NINE FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN BOSTON

School	Date	Class-rooms	Special rooms	Pupils	Cost of building	Plans, specifications, and inspection	Cost per classroom	Cost per pupil	Cost per cubic foot
Patrick Collins	1907	17	5	753	$194,330	$17,666	$11,431	$258	$.268
Edward Everett	1909	14	7	512	118,267	10,752	8,448	231	.229
Nathan Hale	1909	12	4	400	73,955	6,723	6,163	185	.222
John Cheverus	1909	16	7	587	112,977	10,271	7,061	192	.211
Peter Faneuil	1910	17	4	633	118,888	10,808	6,993	188	.275
Wm. L. Garrison	1910	10	2	383	72,766	6,615	7,277	190	.264
Samuel Adams	1910	22	7	757	158,194	14,381	7,191	209	.260
Lafayette	1911	8	4	293	69,084	6,280	8,636	236	.313
Abraham Lincoln	1911	40	8	1,517	308,097	28,009	7,702	203	.266

LIST A.—SPECIAL ROOMS IN NINE FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN BOSTON

Patrick Collins.—Assembly hall, 2 playrooms, domestic science, manual training—total 5.

Edward Everett.—Auditorium, 2 playrooms, nurse's room, cooking room, manual training, teachers' room—total 7.

Nathan Hale.—2 playrooms, nurse's room, teachers' room—total 4.

John Cheverus.—Assembly hall, 2 playrooms, nurse's room, cooking room, manual training, teachers' room—total 7.

Peter Faneuil.—2 playrooms, manual training, teachers' room—total 4.

Wm. L. Garrison.—Nurse's room, teachers' room—total 2.

Samuel Adams.—Assembly hall, 2 playrooms, nurse's room, cooking room, manual training, teachers' room—total 7.

Lafayette.—2 playrooms, nurse's room, teachers' room—total 4.

Abraham Lincoln.—Assembly hall, 2 playrooms, nurse's room, cooking room, manual training, 2 teachers' rooms—total 8.

TABLE 2.—COST DATA FOR 11 FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN CLEVELAND

School	Date	Class-rooms	Special rooms	Pupils	Cost of building	Plans, specifications, and inspection	Cost per classroom	Cost per pupil	Cost per cubic foot
Eagle	1911	21	20	933	$144,492	$5,000	$6,881	$155	$.177
Mt. Pleasant	1912	12	7	533	82,228	2,820	6,852	154	.150
Dawning	1912	12	8	533	87,293	3,000	7,274	164	.158
Chesterfield	1913	12	8	533	100,011	3,425	8,334	188	.180
Kennard	1913	23	14	1,022	153,430	5,250	6,671	150	.161
E. Boulevard	1913	19	9	844	136,430	4,660	7,181	162	.179
Addison	1913	17	12	756	131,585	4,500	7,740	174	.191
Empire	1914	21	12	933	179,447	6,150	8,545	192	.168
Rawlings	1914	21	14	933	194,280	6,650	9,251	208	.159
Murray Hill	1915	28	24	1,244	235,800	8,000	8,421	190	.185
Almira	1915	25	14	1,111	206,540	7,050	8,262	186	.178

LIST B.—SPECIAL ROOMS IN 11 ELEMENTARY SCHOOL BUILDINGS IN CLEVELAND

Eagle.—Auditorium, gymnasium, 3 playrooms, shower, dispensary, 2 rest rooms, open-air cot room, library, domestic science, housekeeping suite (4 rooms), manual training, teachers' lunch, kitchenette, elevator—total 20.

Mt. Pleasant.—Auditorium, gymnasium, 2 playrooms, dispensary, 2 rest rooms—total 7.

Dawning.—Auditorium, gymnasium, 2 playrooms, shower, dispensary, 2 rest rooms—total 8.

Chesterfield.—Auditorium, gymnasium, 2 playrooms, shower, dispensary, 2 rest rooms—total 8.

Kennard.—Auditorium, gymnasium, natatorium, 2 locker and shower rooms, dispensary, 2 rest rooms, room for blind, domestic science, sewing room, manual training, teachers' lunch, kitchenette—total 14.

East Boulevard.—Auditorium, 2 playrooms, dispensary, 2 rest rooms, manual training, teachers' lunch, kitchenette—total 9.

Addison.—Auditorium, gymnasium, handball court, dispensary, 2 rest rooms, teachers' lunch, kitchenette, 4 unassigned—total 12.

Empire.—Auditorium, 2 gymnasiums, natatorium, dispensary, 2 rest rooms, domestic science, manual training, teachers' lunch, kitchenette, unassigned—total 12.

Rawlings.—Auditorium, 2 gymnasiums, natatorium, 2 locker and shower rooms, dispensary, 2 rest rooms, domestic science, manual training, teachers' lunch, kitchenette, unassigned—total 14.

Murray Hill.—2 gymnasiums, natatorium, 2 locker and shower rooms, dispensary, sun room, warming room, 3 rest rooms, domestic science, 2 kitchens, lunch room, housekeeping suite (5 rooms), manual training, filter room, teachers' lunch, elevator—total 24.

Almira.—Auditorium, 2 gymnasiums, natatorium, 2 locker and shower rooms, dispensary, 2 rest rooms, domestic science, manual training, filter room, teachers' lunch, kitchenette—total 14.

TABLE 3.—COST DATA FOR 10 FIREPROOF ELEMENTARY SCHOOL BULIDINGS IN DETROIT

School	Date	Class-rooms	Special rooms	Pupils	Cost of building	Plans, specifica-tions, and inspection	Cost per classroom	Cost per pupil	Cost per cubic foot
Breitmeyer	1915	20	7	765	$106,846	$5,087	$5,342	$140	$.166
Marxhausen	1915	20	7	813	87,269	4,155	4,363	107	.142
Ellis	1915	20	5	812	95,207	4,533	4,760	117	.149
Joyce	1915	20	7	812	97,402	4,638	4,870	120	.152
Lingemann	1915	20	7	746	101,783	4,846	5,089	136	.157
Thirkell	1915	20	7	812	92,845	4,421	4,642	114	.146
Albert Hely	1915	20	7	785	93,282	4,442	4,664	119	.151
Hattie M. Carstens	1915	20	7	827	104,389	4,970	5,219	126	.167
Goldberg	1915	20	13	757	110,303	5,252	5,515	146	.171
Theodore Harms	1916	20	7	815	105,046	5,002	5,252	129	.156

LIST C.—SPECIAL ROOMS IN 10 ELEMENTARY SCHOOL BUILDINGS IN DETROIT

Breitmeyer.—Playroom, clinic and rest room, waiting room, library, domestic science, manual training, recitation—total 7.

Marxhausen.—Playroom, clinic, rest room, library, domestic science, manual training, recitation—total 7.

Ellis.—Playroom, library, domestic science, manual training, recitation—total 5.

Joyce.—Playroom, clinic, rest room, library, domestic science, manual training, recitation—total 7.

Lingemann.—Playroom, clinic, rest room, library, domestic science, manual training, recitation—total 7.

Thirkell.—Playroom, clinic, rest room, library, domestic science, manual training, recitation—total 7.

Albert Hely.—Playroom, clinic, rest room, library, domestic science, manual training, recitation—total 7.

Hattie M. Carstens.—Playroom, clinic, library, domestic science, manual training, recitation, teachers' room—total 7.

Goldberg.—Playroom, 2 showers, clinic, waiting room, 2 cot rooms, library, dining room, kitchen, domestic science, manual training, recitation—total 13.

Theodore Harms.—Playroom, clinic, library, domestic science, manual training, recitation, teachers' room—total 7.

TABLE 4.—COST DATA FOR NINE FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN NEWARK

School	Date	Class-rooms	Special rooms	Pupils	Cost of building	Plans, specifications, and inspection	Cost per classroom	Cost per pupil	Cost per cubic foot
Lafayette	1910–1914	43	10	1,935	$277,943	$13,235	$6,464	$144	$.231
Ridge	1911	18	7	720	121,333	5,778	6,741	168	.177
Webster	1911	16	8	720	129,003	6,143	8,063	180	.187
West Side	1911–1914	39	6	1,665	209,511	9,977	5,372	126	.195
Montgomery	1911	25	6	1,035	148,022	7,049	5,921	143	.192
Teshine	1911	16	5	630	110,610	5,267	6,913	175	.187
Cleveland	1912	39	5	1,665	253,283	12,061	6,494	152	.217
Miller	1913	18	3	810	138,600	6,600	7,700	171	.187
Oliver	1915	22	5	903	134,311	6,396	6,105	149	.189

LIST D.—SPECIAL ROOMS IN NINE ELEMENTARY SCHOOL BUILDINGS IN NEWARK

Lafayette.—Auditorium, gymnasium, physical instructor's room, doctor's room and waiting room, library, 5 teachers' rooms—total 10.

Ridge.—Auditorium, gymnasium, physical instructor's room, doctor's room and waiting room, library, 2 teachers' rooms —total 7.

Webster.—Auditorium, gymnasium, physical instructor's room, doctor's room and waiting room, library, 3 teacher's rooms—total 8.

West Side.—Auditorium, doctor's room and waiting room, 3 teachers' rooms—total 6.

Montgomery.—Auditorium, doctor's room and waiting room, library, 3 teachers' rooms—total 6.

Teshine.—Assembly room, doctor's room and waiting room, 2 teachers' rooms—total 5.

Cleveland.—Auditorium, gymnasium, physical instructor's room, doctor's room and waiting room, library—total 5.

Miller.—Auditorium, gymnasium, physical instructor's room —total 3.

Oliver.—Auditorium, physical instructor's room, doctor's room and waiting room, 2 teachers' rooms—total 5.

TABLE 5.—COST DATA FOR SEVEN FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN ST. LOUIS

School	Date	Class-rooms	Special rooms	Pupils	Cost of building	Plans, specifications, and inspection	Cost per classroom	Cost per pupil	Cost per cubic foot
Madison	1910	26	10	1,127	$200,798	. .	$7,723	$178	$.212
Harney Heights	1911	20	10	867	197,712	$5,691	9,886	228	.185
Bryan Hill	1911	22	8	953	189,768	7,993	8,626	199	.172
Delaney	1911	10	3	433	100,468	5,014	10,047	232	.237
William Glasgow	1912	27	7	1,170	224,631	9,039	8,320	192	.180
Laclede	1914	24	6	1,040	200,539	8,316	8,356	193	.1875
Bryan-Mullanphy	1915	22	9	953	229,182	9,175	10,417	240	.175

LIST E.—SPECIAL ROOMS IN SEVEN ELEMENTARY SCHOOL BUILDINGS IN ST. LOUIS

Madison.—2 gymnasiums, 2 playrooms, 2 shower rooms, medical inspection and rest room, kindergarten workrooms, 2 teachers' rooms—total 10.

Harney Heights.—Assembly room, 2 gymnasiums, 2 playrooms, 2 shower rooms, medical inspection and rest room, kindergarten workrooms, teachers' room—total 10.

Bryan Hill.—2 gymnasiums, 2 playrooms, shower room, medical inspection and rest room, kindergarten workrooms, teachers' room—total 8.

Delaney.—2 playrooms, teachers' room—total 3.

William Glasgow.—2 gymnasiums, 2 playrooms, 2 shower rooms, medical inspection and rest room,—total 7.

Laclede.—2 play or assembly rooms, 2 shower rooms, medical inspection and rest room, kindergarten workrooms—total 6.

Bryan-Mullanphy.—Assembly hall, 2 gymnasiums, 2 shower rooms, medical inspection, domestic science, manual training, kindergarten workrooms—total 9.

Comparative Costs in the Five Cities

Table 6 is a summary table comparing the costs of the five groups of school buildings in the five cities. The contrasts revealed by it are interesting and significant. The average cost per classroom ranges from less than $5,000 in Detroit to more than $9,000 in St. Louis; the cost per cubic foot from over 15 cents in Detroit to more than 25 cents in Boston; the average cost per pupil from $125 in Detroit to $210 in Boston.

TABLE 6.—COST DATA FOR 46 FIREPROOF ELEMENTARY SCHOOL BUILDINGS IN FIVE CITIES

City	Number of buildings	Average cost per classroom	Average cost per cubic foot	Average cost per pupil	Special rooms for 20 classrooms	Average cost per room special and class	Per cent for plans, specifications and inspection
Detroit	10	$4,972	$.156	$125	7.4	$3,629	4.76
Newark	9	6,641	.196	156	4.7	5,232	4.76
Cleveland	11	7,765	.171	175	13.5	4,678	3.42
St. Louis	7	9,054	.193	209	7.0	6,584	3.96
Boston	9	7,878	.256	210	6.2	6,012	9.10

All of the buildings have special rooms, but they vary greatly in number. In Newark there are on the average 4.7 special rooms for each 20 regular classrooms, while in Cleveland there are 13.5 special rooms for each 20 regular classrooms. These figures for the special rooms are most significant, not only from a financial point

of view, but also from an educational one. The child attending school in the typical Cleveland building may be said to have his share of much more than a room and a half, whereas the Boston child has his share of a room and a third, and the one in Newark has a share in less than a room and a quarter. Moreover, these figures fail to give an adequate idea of the educational importance of the situation, for where special rooms are found in ample numbers, as in Cleveland, they include such accommodations as auditoriums, gymnasiums, swimming pools, lunch rooms, and libraries. On the other hand, where special rooms exist in small numbers, they are apt to be limited to such accommodations as two basement play-rooms, a teachers' rest room, and a recitation room.

Moreover, the special rooms vary enormously in size, in cost, and in value. For example, the auditorium may be merely a large room with a high platform at one end and with the view somewhat seriously obstructed by supporting columns. It may, on the other hand, be of the most modern construction with the floor slanted like that of the theatre, with the view entirely unobstructed and the stage equipped with waiting rooms, footlights, and scenery so that it may be effectively used for dramatic presentations.

If we balance off the large special rooms against the small rooms, and the expensive rooms against the cheaper ones, we shall do slight injustice to any city by combining all the special rooms and all the class-rooms and computing a new figure showing the cost per room, including special and regular rooms together. This figure has been computed for all cities and appears in the sixth column of Table 6.

In the last column of the same table are figures showing the proportion which the expense for plans, specifications, and inspection bears in each city to the entire cost of the school buildings. These figures have a range from 3.42 per cent of the building cost in Cleveland, to 9.10 per cent in Boston.

The Rank of the Cities in Schoolhouse Cost

Table 7 is a summary table showing how the five groups of school buildings rank in each one of the six items of cost which have been compared. Thus, the first column shows that Detroit, which is given the rank of one, has the lowest average cost per class-room. The same city has the lowest average cost per cubic foot and per pupil. It is again found in the first rank in the average cost per room when we lump

special and class-rooms together. It ranks in third place in the proportion of special rooms found in its school buildings and in the expense for plans, specifications, and inspection. If we add all of these ranks, we have a total of 10, which appears in the last column of the table. By similar methods the ranks for all of the five

TABLE 7.—RANK OF EACH OF FIVE GROUPS OF ELEMENTARY SCHOOL BUILDINGS IN FIVE CITIES IN SIX ITEMS OF COMPARATIVE COST DATA

City	Average cost per class-room	Average cost per cubic foot	Average cost per pupil	Special rooms for 20 class-rooms	Average cost per room special and class	Per cent for plans, specifications, and inspection	Total of ranks
Detroit	1	1	1	3	1	3	10
Cleveland	4	2	3	1	2	1	13
Newark	2	4	2	6	4	4	22
St. Louis	6	3	5	4	6	2	26
Boston	5	6	6	5	5	5	32

groups of buildings for the five cities have been ascertained, and their totals have been noted. These totals indicate that on the basis of these six sources of cost comparisons, the Detroit schools are the least expensive of those entering into this comparison and the schools of Boston are the most expensive.

It is worth while to note what the Cleveland children receive in comparison with the accommodations provided in other cities for more expense and for less expense per child. We may well choose for this comparison Boston's new Wells District School, the new Murray Hill building in Cleveland, and the Madison building in St. Louis. The reason for choosing the Boston school for this comparison is that the Schoolhouse Department of that city offers it as a type of the new fire-proof buildings now being constructed there.

When the costs of the three schools are figured on the same basis, it is found that the expense per pupil in the Boston school is $210. In the Cleveland building it is $190, and in the St. Louis one it is $178. The accommodations provided in the three buildings are placed in parallel comparison in the lists on the opposite page, and an inspection of the data of this report will show that equally impressive comparisons may be made if other schools are substituted for those chosen for this comparison.

In the case of all three schools, the accommodations listed are those considered as having a direct educational value for the children and such other portions of the buildings as offices, store rooms, toilets, corridors, etc., have been omitted from the comparison.

Boston	St. Louis	Cleveland
Wells District School	*Madison School*	*Murray Hill School*
$210 per pupil	$178 per pupil	$190 per pupil
First-class fireproof	First-class fireproof	First-class fireproof
4 stories	3 stories	3 stories
24 classrooms	26 classrooms	28 classrooms
2 play rooms	2 play rooms	Boys' gymnasium
Auditorium	Boys' gymnasium	Girls' gymnasium
3 teachers' rooms	Girls' gymnasium	Swimming pool
Nurses' room	Boys' shower room	Boys' locker and shower
	Girls' shower room	Girls' locker and shower
	2 teachers' rooms	Dispensary and reception
	Medical inspection and rest room	Sun room for open air classes
	Kindergarten work and store rooms	Warming and locker room for open air classes
		3 teachers' rooms
		Domestic science
		Manual training
		2 kitchens
		Filter room
		Teachers' lunch room
		Pupils' lunch room
		Housekeeping suite
		living room
		bed room
		dining room
		kitchen
		bath room
		Elevator for open air

A careful study of all the facts that have been considered leads to the conclusion that the Cleveland buildings are being efficiently and economically constructed and that the city is receiving a large educational return on its investment in new schools. As compared with the schools in other cities, the Cleveland buildings appear rather expensive in the average cost per class-room and rather inexpensive in the average cost per cubic foot. Among the five cities, two have a lower average cost per pupil and two a higher cost per pupil. Cleveland provides a greater proportion of special rooms than does any other of the cities and when we compare the average costs per room, taking special rooms and class-rooms together, we find the resulting figure a comparatively low one. Cleveland pays less for plans, specifications, and inspection than does any of the other cities and, in the opinion of the members of the Survey Staff, the city receives decidedly high grade services for its moderate expenditures.

The general conclusion of this cost inquiry is that Cleveland is erecting modern socialized school buildings at a moderate cost and is receiving large values in return for its investments.

CHAPTER VI

BUILDING PROBLEM OF THE BOARD

The school population of Cleveland is growing rapidly. In order adequately to care for its children, if the present rate of growth continues the School Board would have to erect on the average one new classroom for every school day in the year. In 1914–15 the number of new classrooms was less than half the number needed to take care of that year's increase alone, while the overflow from previous years remained still uncared for. Each classroom costs approximately $10,000. This means that the Board is faced with the proposition of spending over one and a half millions a year on new buildings, or else changing its method of handling the increasing numbers of pupils.

Not only must rooms be provided; but they must be located near the homes of the children. When the city grows or population shifts, some schools are deserted and others overcrowded. The change in location of the Otis Steel Company's plant to the southwestern part of the

city has resulted in a sudden overflow of pupils in the Tremont school. Hundreds of families are moving into the vicinity of the new works; and demanding school accommodation for their children. Temporary quarters have been arranged in basement or "ground floor" rooms and portables; but now the Board is facing the necessity of erecting an annex to Tremont and will probably soon need to build a new building in the near vicinity. The Harmon school which has until now been seriously overcrowded, is just on the boundary line of what will shortly be an immense freight yard. Over 1,000 families have been forced to leave their homes in order to make room for the new tracks. Their children are no longer in the Harmon district; but where they are going no one yet knows. They may scatter over the city; or migrate in a body. The Board is anxiously concerned as to their destination; for it may seriously affect the school building policy.

Schools must be placed so that pupils will not have to pass dangerous grade crossings. Railways enter the city from 13 different directions. There are in addition many yards and sidings. The movement to abolish grade crossings is gradually gaining foothold; but there are still tracks guarded only by the hinged

wooden gate and a crossing tender. In deciding upon the location of a school, it is necessary for the authorities to arrange some means whereby little children will not run the danger of accidents while crossing railway tracks.

Cleveland is crossed by several deep runs ranging from a hundred feet to over a mile across. The runs and the tracks of the steam railroads are shown in the map on page 96. These runs or gullies are spanned by a few bridges at long distances apart. It is usually true that children living on one side would be obliged to travel a prohibitively long distance in order to go to a school located on the other. The Board, therefore, must see to it that buildings are erected not only where children are numerous, but where they can reach the school easily.

Modernization of Old Buildings

With all these problems the school system must cope. In addition another difficulty arises because of changes in public thought. Of the buildings erected more than 50 years ago, only eight are now in use. This is partly because wood and brick eventually wear out. It is also due to the fact that our ideas concerning education have changed; and the plans of 50 years

These railroads and runs must be taken into consideration in locating buildings

ago do not meet with our present requirements. When the Sterling School was built in 1869, it was described as the "finest school building in the State of Ohio." In 1914 the Board of Education decided to install a new heating plant in the Sterling School. Parents of children living in the district demanded a new building. The Board of Education was able to show that the building was well constructed, adequate in size, and conveniently located. With a new heating plant it could be made serviceable for at least 25 years more. The matter was investigated by the Chamber of Commerce, and its members concluded that the Board of Education was right. The heating plant was installed, and the building continued in use. Yet the opposition of the parents to this plan had never been on the ground that the building was worn out, seriously insanitary, or unsafe. It was none of these things. The difficulty was that the Sterling school had been in continuous use for 45 years. It lacked wardrobes, auditorium, playrooms, gymnasium, swimming pool, shower baths, library, and other adjuncts of modern buildings; and the parents felt that their children were not getting a square deal. The Board of Education would have been glad to furnish a new building to these children; but with serious overcrowding in many parts of

the city, new communities springing up where there was no school at all, and funds seriously inadequate, it could not afford to discard Sterling merely because changing fashions in school architecture had left it out of style.

The Board is faced by the necessity not only of providing new buildings to house increasing numbers of children; but of modernizing old buildings. This work has been done with exceptional care and thoroughness in Cleveland. Indeed it would probably be more just to criticize the Board of Education for having spent very large sums for repairs and replacements in its old buildings, than to charge it with having discarded old buildings too soon.

Extended reference has already been made to the work done in the way of fire protection and precaution against panic. In addition the Board has replaced all old blackboards with modern slate boards, installed modern heating plants in many old schools, straightened out winding stairways, put in new floors, installed modern toilets, and painted interiors throughout the city. Provision has been made in every school for dispensary rooms, and in many buildings expensive structural changes have been made to provide space for offices, store-rooms, and rest and lunch rooms with kitchenettes for the teachers.

School Census Returns and the Building Policy

If the Board of Education is to provide adequate schoolroom facilities for a growing and shifting population, it must be able to estimate how many additional children may be expected in a given year, and to what parts of the city they will go. There is one body of evidence which would help as a basis for such estimates and which is regularly gathered by the Board, but not much utilized for building purposes. Every year, under the provisions of the Ohio law, the Clerk of the Board of Education makes a census of all unmarried children over five and under 21 living within the city of Cleveland. These figures are gathered in the spring and are available for use at the beginning of June.

Probably no better way of judging changes and trends in population could be devised than just such a school census. By comparing results from year to year future growth can be predicted and new buildings planned accordingly; while smaller unexpected shifts can be handled through emergency measures during the summer vacation immediately following the census returns. The school census should be one basis for shaping the future building policy of the Board.

Rooms Should be Built for Use

During the past decade the most noticeable change in school architecture has been the number of special rooms provided. The auditorium and library were among the earliest; now we have in addition the dispensary, playrooms, swimming pool, shower baths, gymnasiums, teachers' lunch and rest rooms, principal's office, manual training, domestic science, and open air classrooms, roof gardens, and other special rooms in steadily increasing numbers.

In planning buildings for the future, two principles must be kept in mind. In the first place, we must remember that "not all that is good is new; and not all that is new is good." Schoolmen often have to withstand enormous pressure brought to bear by people who demand the latest thing in school construction; who feel that the rapid introduction of educational innovations is the criterion of educational progress. The school architect as he works over the plans for future buildings should subject each suggestion to rigorous scrutiny; asking himself "Is this a good way to utilize this space?" and second "Is there any better use to which it can be put?" Rooms which are not going to be used should not be built. An auditorium occupied twice each year for graduation exercises and

once on Washington's birthday is hardly worth the $20,000 required to build it.

The Test of Educational Activities

The second guiding principle in schoolhouse construction is that buildings should fit the needs of the children, rather than that the children should fit the needs of the building. In former years, the course of study instituted by our forefathers was handed down with few changes from one class to the next. The course of study was the important thing, and children were expected to adapt themselves to it. When children failed they were regarded as pathological specimens of whom little could be expected in after life, and when some few of these became noted men they were explained by the lazy, comfortable formula "exceptions prove the rule."

Present day educators are changing all that. We no longer adhere to a rigid curriculum, and expect the child to conform to it. We are beginning to realize that the schools are made for the children; and the things of the school must fit themselves to the needs of the children. Architects like teachers must face the same fact. They have already done so, for example, in providing blackboards low enough so that

children can write upon them, and chairs adjustable to the children who sit in them. Yet sometimes we find first grade children trying to write upon boards originally intended for their eighth grade brothers and sisters; and sitting in chairs adjusted to fit children who have since been promoted. When the architectural department finds the windows of its finest creation being broken by children in the playground, the solution is not to close the playground, but to protect the windows and supervise the play.

This is perhaps the greatest lesson which we have to learn. Changing curriculum and teaching methods, new organization, and developments in building plans bear witness to the fact that we are learning. We are beginning to submit our actions to the acid test of one simple rule. For through all the complexity of the modern educational system, the fact remains that schools exist for the sake of the children; and whatever we as educators do must be for the ultimate purpose of meeting more fully the children's needs.

CHAPTER VII

SUMMARY

1. The school buildings of Cleveland are evidence of wise and progressive policy, having its inception before the organization of the city, and growing in accordance with growing educational ideals. The amount of money expended on school plants has increased from $12,000 in the decade from 1840 through 1850, to nearly 800 times as much in the 10 years just ended. This enormous increase in investment is partly due to enlarging population, but in a far greater degree to a determination that the fullest possible educational opportunity shall be open to Cleveland's children.

2. The building policy has been shaped by five watchwords of progress. The first is "education." The earliest and most fundamental developments in schoolhouse construction came through changing methods of teaching and learning. Children were sent to school for the purpose of acquiring skill and knowledge. Any change in building or equipment which

would lead to efficiency in the learning process was held to be therefore desirable. Cleveland schools show a steadily progressive growth in providing adequate educational facilities for teachers and children.

3. The second watchword by which building policy has been shaped is "economy." From the first, Cleveland seems to have pursued a fairly economical policy of schoolhouse construction. Plans have been elaborated as needs grew. Architects and engineers have been employed as regular members of the staff; and uniform standards of building construction are gradually being adopted to secure beauty, durability, and usefulness at the lowest ultimate cost.

4. The third word which has been of influence in formulating the building policy is "safety." This is a matter of recent growth—the direct result of the disastrous school fire at Collinwood. Ten years ago there was comparatively little concern about the safety of school buildings. Today there is active and constructive interest. Cleveland is one of the few cities in the United States where the Collinwood disaster could never be repeated. Cleveland parents may send their children to the public schools and have no uneasiness as to their safety.

5. The fourth slogan is "health." One of the influences most potent in changing types of school architecture in recent years is the realization that the health of the children is a public trust, and as such provision for its care is properly a function of the public school. Cleveland was one of the pioneers in this field; and in the matter of indoor planning and equipment still holds place as one of the leading cities in the country.

6. Education, economy, safety, health, and happiness,—these are the five watchwords of educational progress. The element of happiness is perhaps the newest conception, and it is in this field that some of the most striking innovations of the future will surely come. The school of today is beginning to recognize that play is a necessary activity of growth, and is placing increasing emphasis upon space, equipment, and instruction within school properties for recreational purposes.

7. Cleveland is now using school buildings erected in each of the past seven decades. During this entire period the cost of accommodating each child in a schoolhouse has steadily and rapidly advanced. A study of the types of buildings erected in each decade shows that this increasing cost has been caused by such successive changes as building rooms to accom-

modate fewer children, supplying running water, indoor toilets, and coat rooms; making buildings more beautiful; fireproofing; and providing special equipment such as auditoriums, gymnasiums, playrooms, swimming pools, shower baths, teachers' rest and lunch rooms, dispensaries, libraries; and rooms for the kindergarten, blind, backward, manual training, domestic science, and open air classes.

8. Cleveland has 109 elementary, one normal, and 11 high school plants. Of 192 elementary buildings and annexes now in use, 65 were built within the past 10 years, 48 are 25 years old or more, and eight were erected before the beginning of the Civil War.

9. Many school buildings are located on corners facing one or more street car lines. If the school is so located that children are compelled to cross car tracks in coming and going, it is probably safer to have those tracks in streets immediately adjacent rather than one block away. Where most of the children are not compelled to cross the track, it is undoubtedly better to place the school upon a quiet side street. The greatest endeavor should be made to have the neighborhood of every school a zone of quiet. Asphalt should take the place of brick and stone. Car tracks should be kept in good repair, and rails frequently

greased at corners to prevent loud screeching of wheels.

10. The newer schools of Cleveland are well designed, with imposing and beautiful exteriors. They are so planned that additional rooms may be added without impairing the appearance and utility of the building. Old schools are painted, cleaned, and in good repair. Many of the newer buildings are provided with lawns or sunken gardens, while most of the older schools have plots of grass on two sides and are ornamented with shrubs, flowering plants, and foliage. Landscape gardening in Cleveland is exceptionally good. It combines economical use of space with low cost and good artistic treatment.

11. Classrooms in old buildings are frequently too large, and ceilings too high. In the newer buildings they are in accord with modern standards. Walls and ceilings are tinted in combinations of gray and cream, according to their relation to points of the compass. Wardrobes have steadily improved in type, and in most of the modern buildings are economical of space, well ventilated, and well equipped.

12. Except in a few houses used temporarily to relieve crowded conditions, there is no case of front lighting or three-sided lighting in any regular classroom. Some special rooms, such as those used for kindergartens, domestic

science, etc., have light on three sides. In the newer buildings windows are on one side only. They are of good size and reach well up towards the ceiling, but they are sometimes too far front so that light strikes into the eyes of some of the pupils. Windows should be arranged along the left wall beginning near the back, but not running all the way up to the front of the room.

13. In many schools, new as well as old, there are rooms which receive light from the north side only. Such lighting is pedagogically desirable but hygienically doubtful. North light is restful but lacks the health-giving qualities of direct sunshine. Contagious disease spreads among children by minute drops of mucus sprayed into the air in coughing or sneezing. The best way to render these drops sterile is to flood every corner of the schoolroom with sunshine. School buildings should, when possible, be placed so that every room may receive sunshine during some part of the day.

14. Every regular classroom in Cleveland (except those in temporary quarters) is equipped with natural slate blackboards. This is an unusually fine record, and an evidence of wise investment. In some schools, first and second grade children are occupying rooms intended for upper grade children, and the blackboards

are consequently too high for them comfortably to write upon. A study should be made to locate these rooms. Where possible, boards should be lowered. In other rooms narrow platforms might be constructed so that little children would be able to write upon the blackboard without undue reaching and straining.

15. Nearly three-fourths of the schoolrooms are equipped with adjustable seats and desks, and more of the same type have been ordered. This is an excellent record. Care should be taken, however, not only to purchase furniture of good type, but—first, to see that desks and chairs are placed with the edge of the chair extending one and a half inches under the desk, so that children can sit comfortably well back on the chair; and—second, after every promotion period, to see to it that chairs and desks are raised or lowered to fit the needs of the children who have just been assigned to them. Teachers should be trained to notice incorrect seating and report it to their principals, and in addition regular inspection should be made by members of the medical inspection staff. These matters have not as yet received sufficient attention in the Cleveland system.

16. The schools of Cleveland are unusually well supplied with auditoriums, gymnasiums, playrooms, swimming pools, showers, teachers'

rest and lunch rooms, dispensaries, and rooms for the kindergarten, blind, backward, manual training, domestic science, and open air classes. These rooms are well planned and usually well equipped. The dispensaries are especially interesting because in old buildings many of them represent an ingenious adaptation of waste corners to the needs of nurse and doctor. Newer buildings are planned so that the auditorium, gymnasium, playroom, pools, showers, toilets, and library can be opened to the public without opening the rest of the school. This makes such buildings particularly convenient for community center uses.

17. Libraries are frequently housed in basement rooms, portable buildings, and hallways. In the near future arrangements should be made whereby branches of the public library may be located on school property, but directly accessible to the public so that they may be open in the evening as well as during school hours.

18. Toilet facilities in the elementary schools are not extremely bad, but neither are they good. Rooms are frequently dark, crowded, poorly arranged, and ill smelling. They are well cared for by the custodians, but it is difficult to keep them clean or hygienic. A study of the toilet rooms in elementary schools leads to the following suggestions:

a. Wherever possible, seats should be placed around the walls of the room and urinals down the center, because this arrangement avoids cutting off light from the windows. In the few schools where this has been done, improvement is marked.

b. Most of the newer buildings provide drinking fountains outside the toilet rooms. This practice is preferable to placing them inside because it separates the children into groups, and lessens the tendency toward loitering and confusion.

c. Floors should not be of cement. A few of the newer schools have asphalt floors in the toilet rooms. This is wise, because uric acid sets up a chemical action in cement which cannot be corrected, and for this reason cement should not be used near seats or urinals.

d. The members of the Survey Staff believe that in all new buildings toilets should be provided with doors, such as are now installed in the girls' toilet of the new Empire School. These should be arranged to swing in when not in use. Urinals should be separated by partitions. At present in most of the schools there are no doors or screens of any kind. The citizens of Cleveland would not tolerate such exposure in their own homes, and there seems

to be no good reason why they should demand it of their children.

e. In planning toilet rooms in new buildings, a careful study should be made of individual flushing systems, in an effort to find something more satisfactory than the present system of latrines. Probably a more effective method would be the individual flush, where water is released by the removal of weight from the seat. The porcelain open-front seat now being introduced into a few schools is a marked improvement over the old style wood.

f. Care should be taken to provide seats of different heights from the floor for different sizes of children. At present there is no such provision.

g. Metal urinals are now being replaced with porcelain and glass. This policy is strongly to be commended, and should be carried to a completion as rapidly as possible.

h. In some of the buildings toilet facilities are strikingly inadequate. Whenever extra classes are established in ground floor rooms, auditoriums, portables, etc., the provision of toilets should be correspondingly increased.

i. In planning new buildings, the Board should consider locating toilets on upper floors as well as in basements. This makes the lighting problem much simpler.

19. There is probably no city in the country so large and so old as Cleveland where the danger of fire is so slight. All new buildings are fireproof. In old buildings basements have been completely shut off by metal or concrete ceilings, walls, and doors. Wooden stairs have frequently been replaced by fireproof stairs. Handrails have been supplied on each side. Square corners and alcoves at landings and exits have been cut off by wooden bars. Every room has been provided with an outside exit to the ground or fire escape. Fire escapes are commodious and of good design. Many principals provide that children shall regularly use the fire escapes on clear days instead of going down stairs. (It would be well if this were made compulsory in all non-fireproof schools.) Attics are clean, and kept locked. Fire alarms are plainly labeled. Every precaution is taken against panic. In guarding against the fire hazard, Cleveland has done a remarkable piece of work.

20. Heating and ventilating in Cleveland is probably as well handled as in any other large city. Engineers are doing the best they can, but here, as elsewhere, satisfactory results have not as yet been secured. The New York State Commission on Ventilation is now studying the problem, and it seems the part of wisdom

for other authorities to suspend judgment on what constitutes the best school heating and ventilating system until the Commission publishes its final report. The engineers charged with this matter in Cleveland are holding their own plans tentative in nature, until the results of this study are made available.

21. A comparison of the costs of the Cleveland buildings with similar schools in Boston, Detroit, Newark, and St. Louis leads to the conclusion that this city is erecting modern socialized school buildings at a modern cost, and is receiving large values in return for its investments.

22. If the present rate of growth continues, in order to care adequately for its children under the present plan, the School Board will have to erect one new schoolroom for every school day in the year. A modern schoolroom costs $10,000. This means for new buildings alone an annual expenditure of over one and a half millions. In deciding how the building funds of the system shall be spent, there are four especially difficult problems to be met:

a. Schools must be located near the homes of the children. When the city grows or population shifts, new quarters must be provided to meet new needs.

b. Schools must be placed so that children

will not have to pass dangerous grade crossings. Railways enter from 13 different directions, and cut through the city. Many of the crossings are only protected by watchmen and wooden gates. Schools must be so located that in going to them children will not run the danger of accidents while crossing railway tracks.

c. Cleveland is divided by several deep runs or gullies across which there are few bridges. Buildings must be placed so that children on one side will not be obliged to make a wide detour in order to go to school on the other.

d. Schoolhouses rapidly go out of style. Parents feel that they have the right to demand the best that is known for their children, and no matter how sound structurally a building may be, if it fails to provide gymnasiums, libraries, lunchrooms, and other modern features, they look upon it with disfavor. The Board is faced by the necessity not only of providing new buildings to house increasing numbers of children, but of discarding old buildings and replacing them by others which will more nearly accord with modern ideas of correct educational housing.

23. In order to provide adequate schoolroom facilities, the Board of Education must be able to estimate how many additional children may

be expected in a given year, and to what parts of the city they will go. One way to aid in judging such changes and trends in population is to use the school census which the law provides must be taken under the direction of the Clerk of the Board. By comparing results from year to year future growth can be predicted and new buildings planned accordingly, while smaller unexpected shifts can be handled through emergency methods during the summer vacation immediately following the census returns. The school census should be one basis for shaping the building policy of the Board.

24. There are two principles upon which building policy should rest. First,—rooms should be built for use. No matter how loudly demanded they may be, rooms which are not going to be used should not be built. The school architect in making each new plan should ask himself, "Is this a good way to utilize this space? What definite purpose will it serve? Is there any better use to which it can be put?"

The second principle is that children should not be expected to fit the plan of the building, but buildings should be planned to fit the needs of the children. Just as teaching, supervision, administration, business policy, and other parts of the school system, so also the school plant must be plastic in character, changing and

developing for one single purpose,—to provide the best possible environment for the children whom it serves. For, through all the complexity of modern education, the fact remains that schools and school systems exist for the sake of the children, and whatever educators do, must be for the ultimate purpose of meeting more fully the children's needs.

CLEVELAND EDUCATION SURVEY REPORTS

These reports can be secured from the Survey Committee of the Cleveland Foundation, Cleveland, Ohio. They will be sent postpaid for 25 cents per volume with the exception of "Measuring the Work of the Public Schools" by Judd, "The Cleveland School Survey" by Ayres, and "Wage Earning and Education" by Lutz. These three volumes will be sent for 50 cents each. All of these reports may be secured at the same rates from the Division of Education of the Russell Sage Foundation, New York City.

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